

# Northern California Catastrophic Flood Response Plan (NCCFRP) Overview

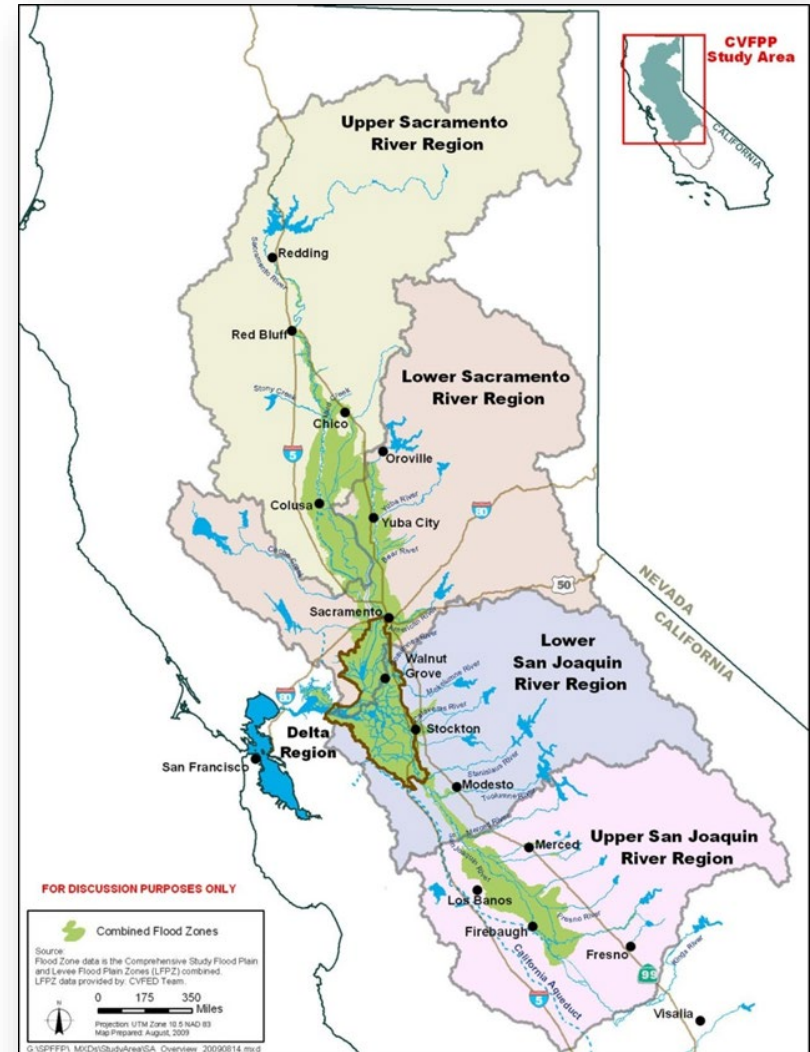


# Why a Catastrophic Flood Plan?

Sacramento-San Joaquin Delta Emergency Preparedness Act of 2008 (SB27)

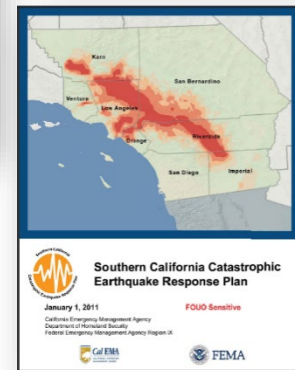
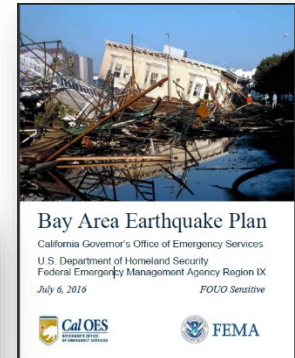
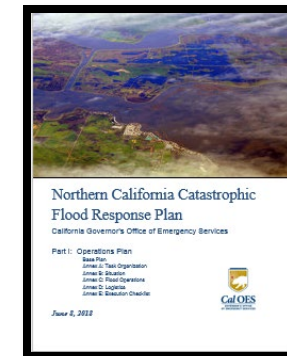
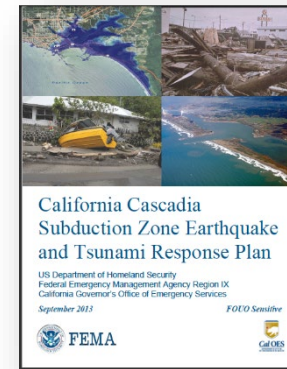
- Establish Sacramento-San Joaquin Delta Multi-Hazard Task Force
- Tasked with developing recommendations for:
  - A unified command system organizational framework
  - Emergency preparedness and response strategy for the Delta region
    - **Develop Catastrophic Flood Plan**
  - Conduct exercises and training

**The NCCFRP is more than just a Delta flood response plan.**



# Northern California Catastrophic Flood Response Plan

- State lead planning effort with FEMA support. State agencies stepped up.
- 4<sup>th</sup> catastrophic plan. (Bay Area Earthquake Plan, Southern CA Earthquake Plan, & Cascadia Earthquake & Tsunami Plan)
- **First weather based catastrophic flood plan** which presented unique challenges (progressive weather event vs no-notice event).
- Plan identifies flood and earthquake threat.
- Better defined area of impact (in or out of flood zone).

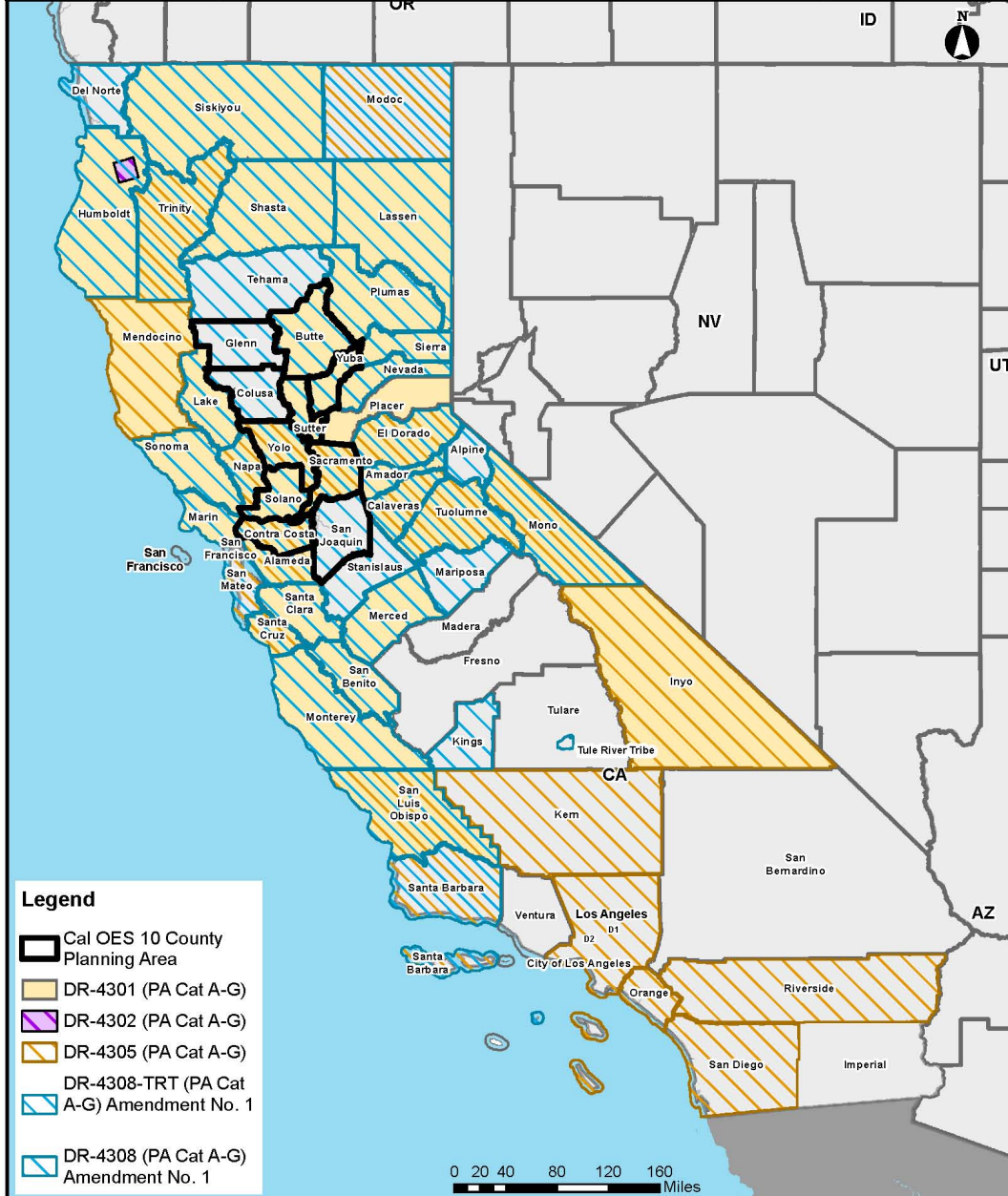


# Northern California Catastrophic Flood Response Plan

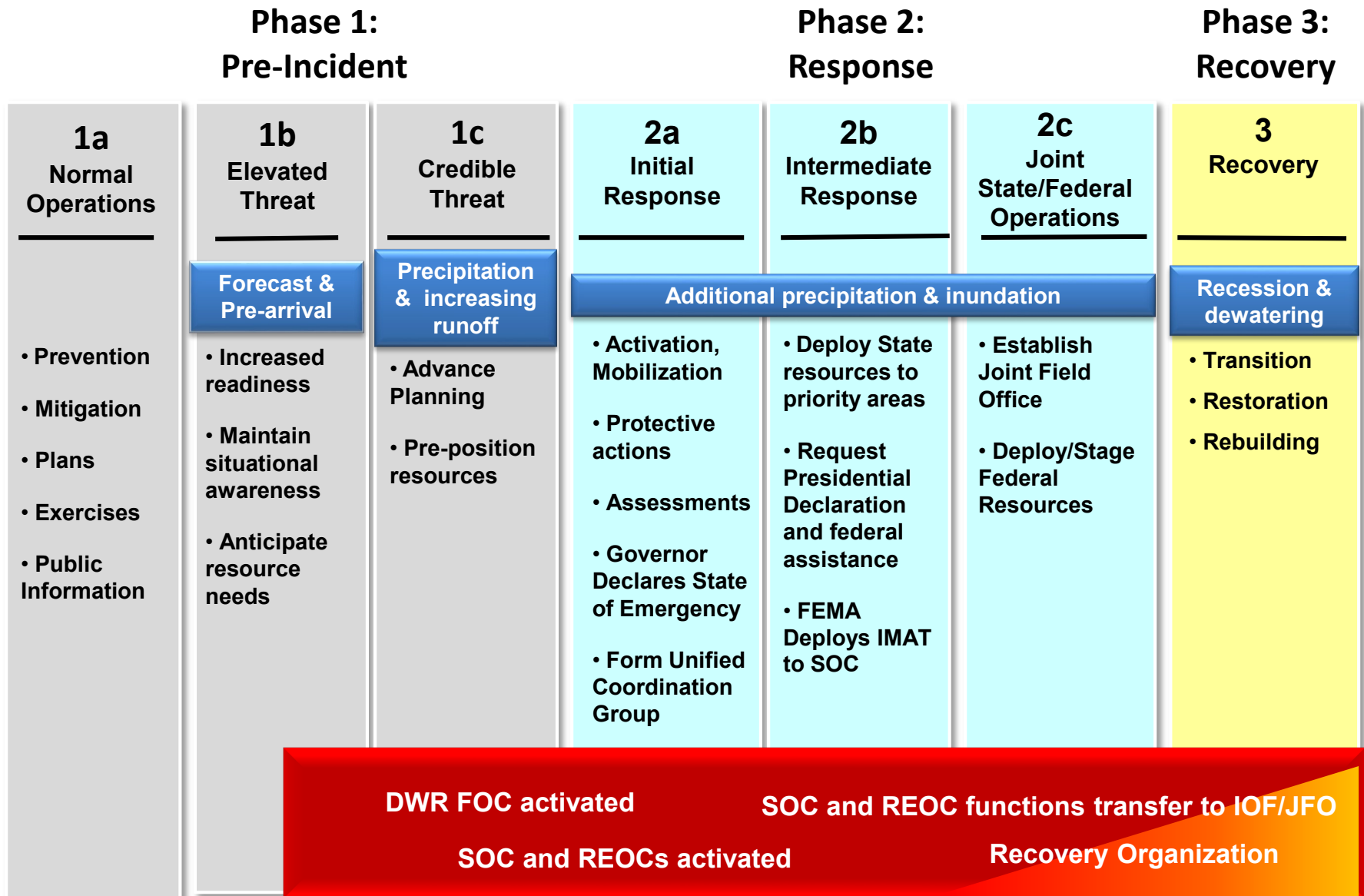
- Plan designed for State/Federal operations, planning, training, and exercises. Plan can also be used for any type of flood event in planning area.
- Provides tools for geographic operations (Operational Areas [OAs] and Branch profiles).
- January/February 2017 winter storms validated the NCCFRP phases, assumptions, and planning factors.
- Used as base plan for the Oroville Dam Response Plan.
- Can be used as a model for county flood plans.



Bay Area Earthquake Plan	Northern CA Flood Response Plan
<b>Version:</b> Update to existing plan	<b>Version:</b> New plan
<b>Event:</b> No Notice, Sudden Earthquake	<b>Event:</b> Progressive Weather Event
<b>Declarations:</b> Immediate (Local, State, Federal)	<b>Declarations:</b> Local – 1 to 2 days State – 5 to 6 days after locals Federal – 7 to 9 days after event
<b>Area Affected:</b> 18 Counties around San Francisco Bay Area (San Andreas and Hayward Fault)	<b>Area Affected:</b> 10 counties in the Sacramento Valley (Assumes all 58 counties affected by flooding)
<b>Time of Year:</b> Year round	<b>Time of Year:</b> December - April
<b>Weather:</b> Unknown but assumes mild	<b>Weather:</b> Winter (Cold, Rain, Snow)
<b>Strategy:</b> Gaining access through <i>a multi-modal transportation access strategy</i> to enable response and recovery operations (shelter in place)	<b>Strategy:</b> <i>Revolves primarily around evacuations</i> , search and rescue, mass care, medical support, infrastructure recovery, and other response and recovery efforts in support of local government (no shelter in place)
<b>Federal Support:</b> Immediate	<b>Federal Support:</b> Gradual (over days or weeks)
<b>Logistics:</b> Commodity Points of Distribution strategy to support shelter in place populations	<b>Logistics:</b> Support shelter and medical/health operations



# Catastrophic Flood Response Phases



# NCCFRP Flood Scenario

A severe flood incident that could inundate a great portion of the Sacramento River Basin and the Sacramento-San Joaquin Delta Region. Flooding would affect local and state government agencies along with millions of residents requiring widespread evacuations. Infrastructure restoration could take several months to years.

**A weather event large enough to cause catastrophic flooding will have far reaching impacts affecting other areas of the state and potentially other western states.**





# Geography

Sacramento River Hydrologic Region (5) includes the northern half of the Central Valley. The Sacramento River runs from the north down through Sacramento into the Delta and is the most heavily dammed and diverted rivers in planning area. Major rivers include the Sacramento, Feather, American, Yuba, San Joaquin, Consumnes and the Mokelumne with several creeks and streams.

San Joaquin River Hydrologic Region (6) includes the Central Valley. The San Joaquin River runs northwesterly through the Delta to Suisun Bay and has the least storage and channel capacity. Major rivers include the San Joaquin, Merced, Chowchilla, Fresno, Stanislaus and Tuolumne with several creeks and streams.

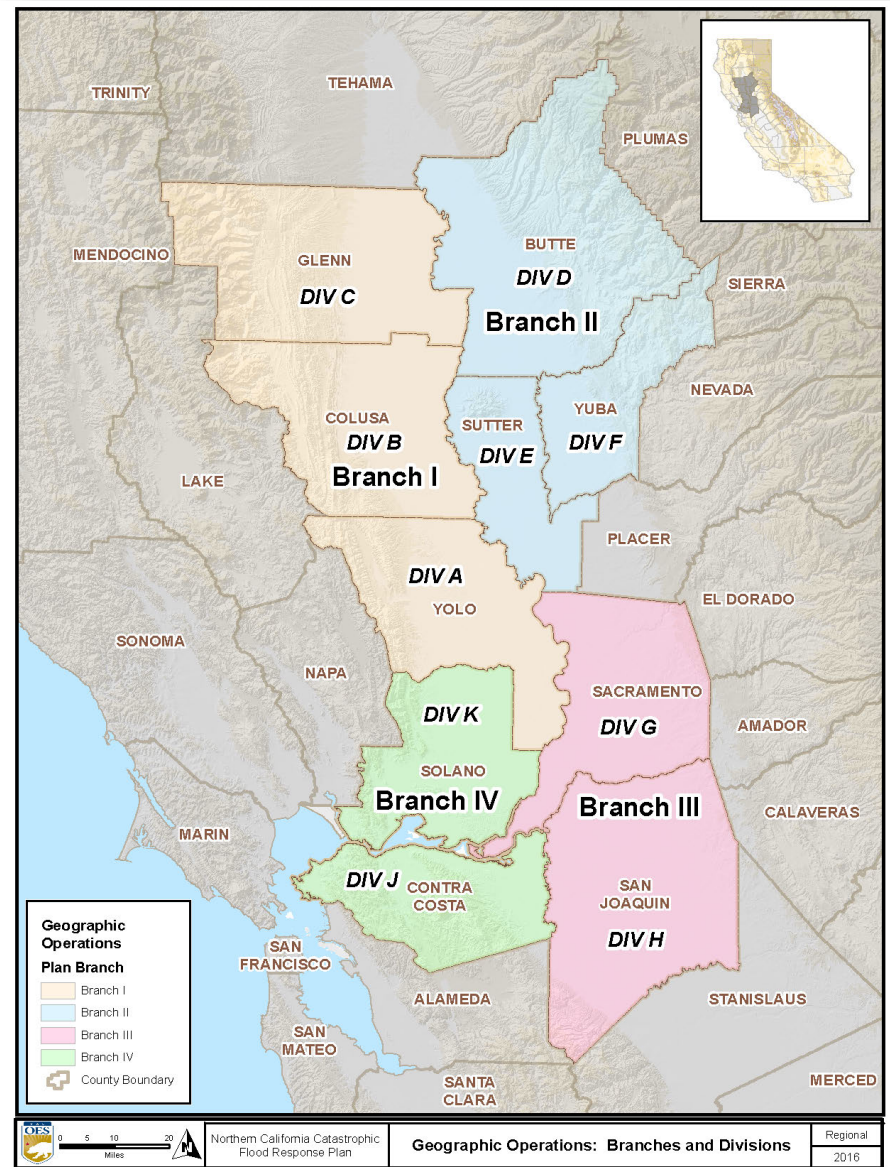
**All water drains through the Delta to the ocean.**

## Natural Hydrologic Regions



# 10 Counties in Northern CA

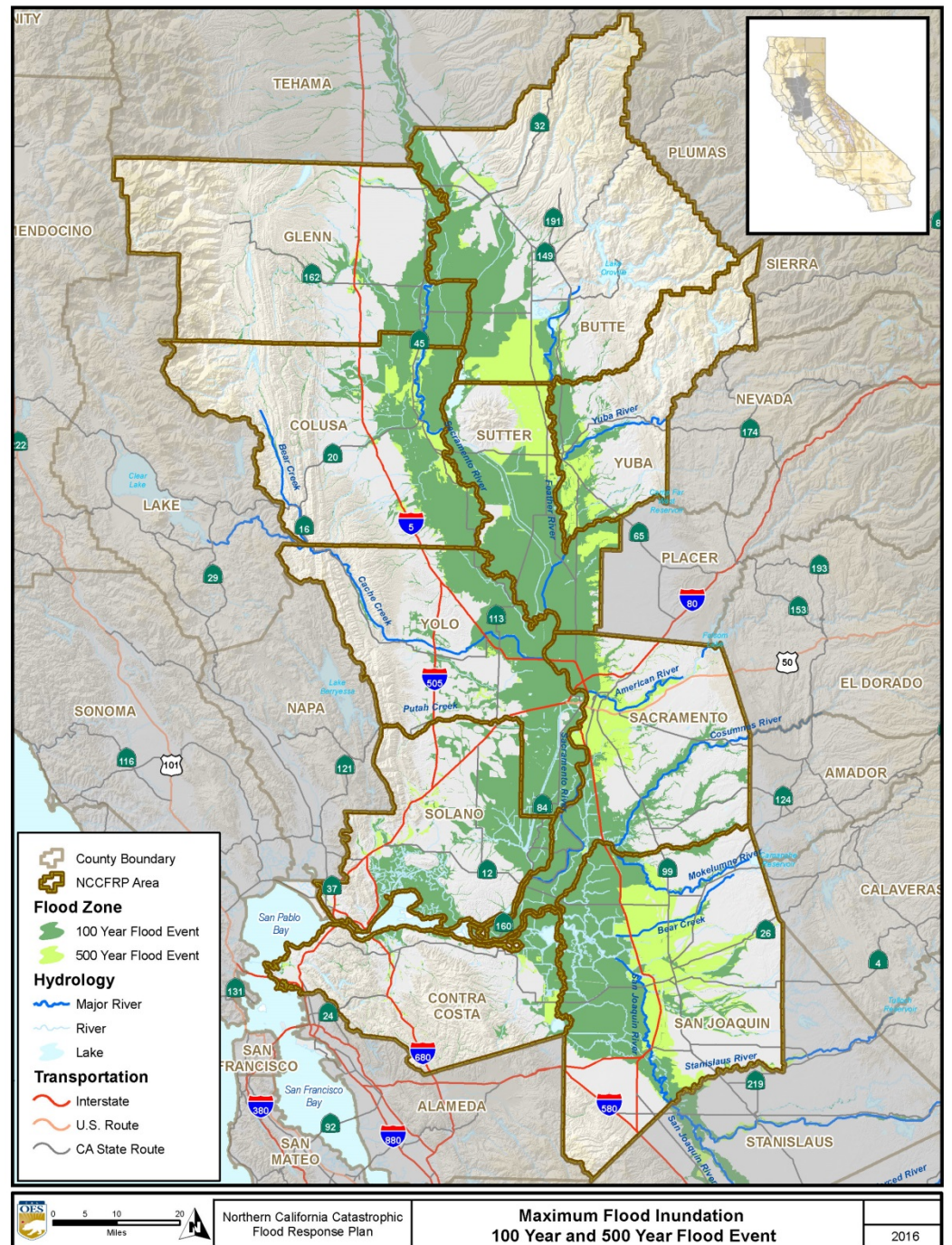
- Butte
- Glenn
- Colusa
- Sutter
- Yuba
- Yolo
- Sacramento
- Solano
- San Joaquin
- Contra Costa



# Based on FIRM and USACE 100/500 Yr Flood Zones

## The Numbers:

- 1.4 million people exposed with 350,000 requiring shelter
- 503,000 households exposed
- 137,000 children under 5
- 171,000 people over 65
- 62,000 businesses
- \$104 billion in structures
- \$2.7 billion in crop values
- 347 State/Federal threatened, endangered species



# Acres Exposed to Flooding

County	Total Acreage	Area Exposed in 100 Yr Flood Zone		Area Exposed in 500 Yr Flood Zone	
		Acres	% of Area Exposed	Acres	% of Area Exposed
<b>Butte</b>	1.1 million	198,800	19	271,300	25
<b>Colusa</b>	740,000	175,300	24	229,200	31
<b>Contra Costa</b>	514,000	113,000	22	125,300	24
<b>Glenn</b>	849,100	123,300	15	133,800	16
<b>Sacramento</b>	636,100	119,300	19	273,500	43
<b>San Joaquin</b>	912,600	242,900	27	435,200	48
<b>Solano</b>	582,400	119,200	34	224,400	39
<b>Sutter</b>	389,300	195,000	50	308,400	<b>79</b>
<b>Yolo</b>	653,500	239,900	37	260,600	40
<b>Yuba</b>	412,000	51,800	13	95,400	23

Source: DWR CA's Flood Future Report (2013)

# Population Statistics

Operational Area/County	Total Population	Population Exposed to Flooding in 100 Yr Event	Population Exposed to Flooding in 500 Yr Event	Total Population Exposed to Flooding
<b>Branch I</b>				
Division A – Yolo	206,439	68,614 (33%)	9,587 (5%)	78,201 (38%)
Division B – Colusa	22,143	4,210 (19%)	2,106 (10%)	6,316 (29%)
Division C – Glenn	28,864	4,517 (16%)	5,532 (19%)	10,049 (35%)
<b>Branch II</b>				
Division D – Butte	223,456	17,327 (8%)	31,620 (14%)	48,947 (22%)
Division E – Sutter	95,894	9,479 (10%)	83,757 (87%)	93,236 (97%)
Division F – Yuba	74,505	26,594 (36%)	26,229 (35%)	52,823 (71%)
<b>Branch III</b>				
Division G – Sacramento	1,456,424	103,209 (7%)	502,691 (35%)	605,900 (42%)
Division H – San Joaquin	711,503	53,524 (8%)	369,064 (52%)	422,588 (59%)
<b>Branch IV</b>				
Division J – Contra Costa	1,089,972	47,069 (4%)	32,932 (3%)	80,001 (7%)
Division K – Solano	422,431	39,661 (9%)	21,926 (5%)	61,587 (15%)
<b>Totals</b>	<b>4,331,631</b>	<b>374,204 (9%)</b>	<b>1,085,444 (25%)</b>	<b>1,459,648 (34%)</b>

Source: 2015 Census Data

# Planning Assumptions



- A severe weather event that produces widespread flooding will affect most of California. Response assets will be engaged throughout the state.
- Approximately 1.4 million people may need to evacuate. About 350,000 (25%) may require sheltering or support.
- Flooding and landslides will disrupt surface transportation networks. Ports, major highways, airports, and railroads will be affected.
- Heavy rainfall, flooding, snow, and landslides will affect roads going into the Sierra and limit evacuations to the east.



# Critical Considerations

- Flooding will result in mass evacuations of the general population and medical facilities.
- **Sheltering in place is not a viable shelter strategy.**
- Loss of life, injury, and property damage from flooding can be reduced by timely warnings (evacuations, mitigation measures).
- Unknown casualties. Mass fatalities may result during an unexpected levee break or if people refuse to evacuate.
- Flooding and landslides will disrupt power, water, transportation, communications, healthcare, and other infrastructure beyond the 100/500 year flood zones.
- Utilities will protect their infrastructure by shutting down prior to flooding.



# Critical Considerations cont.

- The Delta is particularly vulnerable to levee failures due to location, aging infrastructure, low elevation, and subsidence. Other areas in Northern California are considered at high-risk.
- Flooding will impact agricultural and farm-related businesses causing economic damages and losses totaling more than \$2.7 billion.
- Flooding could impact over 503,000 homes and on average **only 10% of residents carry flood insurance.**
- Flooding could impact over 62,000 (40%) businesses resulting in a loss of jobs causing long term economic damages.
- Numerous State Government facilities are located in the flood zone including the State Capitol and many State agency headquarters. Continuity of Government/Operations will run concurrently with state response activities.





# What is the Threat?

- Weather events such as Atmospheric Rivers, El Nino, La Nina, and ARkStorm scenario.
- Contributing factors such as burn areas, snow pack, and reservoir conditions/operations.
- Seismic risk to Delta is moderate to high due to active faults in the San Francisco Bay Area.
- High water conditions causing overtopping or failure of levees.
- Dry weather (sunny day) levee failure events.
- Other threats such as coastal hazards (high and low tides), climate change, marine debris, and hazardous waste.
- Reviewed river gage data (monitor/flood/danger stages) and local evacuation triggers.



# Flood Control System



- **Levees**

- Levees (State Plan of Flood Control and Non-State Plan of Flood Control)
- Levee Vulnerability (86 Critical Points of Interest and 207 Serious Points of Interest)



- **Weirs and By-passes**



- **Dams**

- 110 State Jurisdictional Dams
- 14 Federal Dams
- New Dam Classifications
- 30 dams in the 100 yr flood zone
- ID'ed other dams impacting planning area

# Infrastructure Statistics (1 of 2)

- Law Enforcement Facilities – 172 in planning area (50 at risk)
  - 18 in 100 yr flood zone
  - 32 in 500 yr flood zone
- Fire Facilities – 426 in planning area (146 at risk)
  - 52 in 100 yr flood zone
  - 94 in 500 yr flood zone
- Emergency Operations Centers - 71 in planning area (24 at risk)
  - 6 in 100 yr flood zone
  - 18 in 500 yr flood zone
- Correctional Facilities – 36 in planning area (18 at risk)
  - 6 in 100 yr flood zone
  - 12 in 500 yr flood zone
- County Government Centers – 10 in planning area (7 at risk)
  - 1 in 100 yr flood zone
  - 6 in 500 yr flood zone



# Infrastructure Statistics (2 of 2)

- Tribal Government – 9 tribes in planning area
  - 3 in 100 yr flood zone
- Schools – 2,235 in planning area (775 at risk)
  - 164 (7%) in 100 yr flood zone
  - 711 (32%) in 500 yr flood zone
- Power – 3 power plants in Contra Costa County supply 70% of power to the bay area
- Power Substations – 597 in planning area (244 at risk)
  - 84 in 100 yr flood zone
  - 160 in 500 yr flood zone
- Water/Wastewater Treatment Plants – 133 in planning area (58 at risk)
  - 37 in 100 yr flood zone
  - 21 in 500 yr flood zone



# Public Health and Medical Statistics

- Health Care Facilities – 850 licensed health care facilities in planning area (372 at risk)
  - 41 in 100 yr flood zone
  - 331 in 500 yr flood zone
- General Acute Care Hospitals - 44 in planning area
  - 17 (39%) may require full or partial evacuation
  - 37 emergency departments and 14 (38%) exposed to flooding
- Long Term Care Facilities – 269 in planning area (110 at risk)
  - 8 in 100 yr flood zone
  - 102 in 500 yr flood zone



# Agriculture Statistics

- 1,462,000 (\$2.7 billion) crop acres exposed to flooding
- California produces all or nearly all of the national product of **almonds**, dates, figs, kiwifruit, **olives**, **clingstone peaches**, pistachios, **dried plums**, raisins and **walnuts**.
- Dairies – 177 in planning area (53 at risk)
  - 34 in 100 yr flood zone (21,760 cows)
  - 19 in 500 yr flood zone (12,160 cows)
- Pets
  - 346,063 dogs
  - 378,060 cats
  - 42,073 birds
  - 24,296 horses



# The Plan – Part I: Operations

- Base Plan
- Annex A: Task Organization
- Annex B: Situation
- Annex C: Flood Operations
- Annex D: Logistics
- Annex E: Execution Checklist
- Appendices:
  - A: Response and Recovery Core Capabilities
  - B: Acronyms
  - C: References



## Northern California Catastrophic Flood Response Plan

California Governor's Office of Emergency Services

### Part I: Operations Plan

Base Plan  
Annex A: Task Organization  
Annex B: Situation  
Annex C: Flood Operations  
Annex D: Logistics  
Annex E: Execution Checklist



*June 8, 2018*

# The Plan – Part II: Operational Annexes



## Northern California Catastrophic Flood Response Plan

California Governor's Office of Emergency Services

### Part II: Operational Annexes

Annex F: Evacuation/Transportation Operations  
Annex G: Mass Search and Rescue Operations  
Annex H: Public Information Operations  
Annex I: Alert/Warning and Communications Operations  
Annex J: Mass Care and Shelter Operations  
Annex K: Infrastructure – State and Local Government Operations  
Annex L: Infrastructure – Water/Wastewater Operations  
Annex M: Infrastructure – Energy Operations  
Annex N: Infrastructure – Agriculture Operations  
Annex O: Public Health and Medical Operations  
Annex P: Recovery Operations



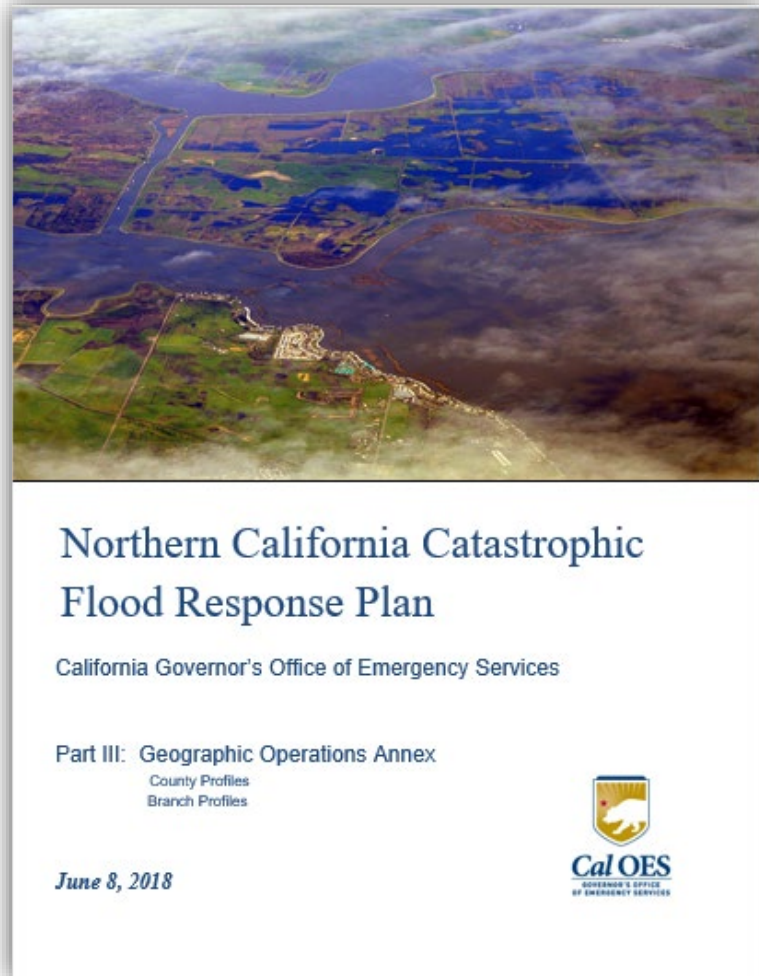
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- Evacuation/Transportation Operations
- Mass Search and Rescue Operations
- Public Information Operations
- Alert/Warning and Communications Operations
- Mass Care and Shelter Operations
- Infrastructure – State and Local Government Operations
- Infrastructure – Water/Wastewater Operations
- Infrastructure – Energy Operations
- Infrastructure – Agriculture Operations
- Public Health and Medical Operations
- Recovery Operations (transition to recovery)



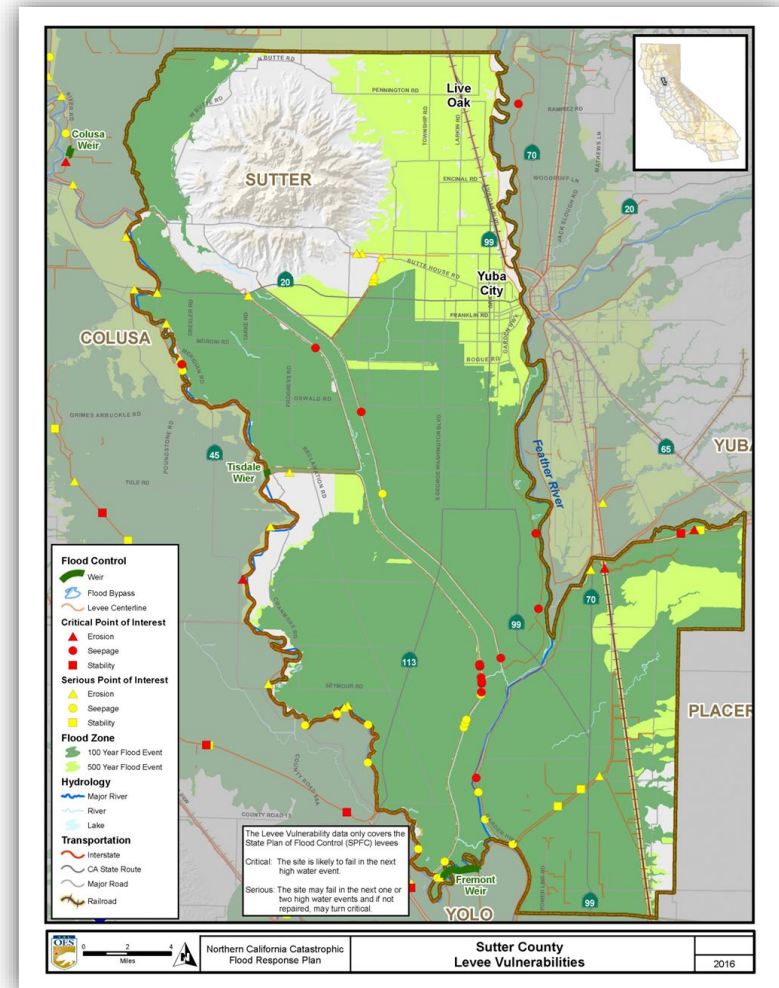
# The Plan – Part III: Geographic Operations

- County Profiles
  - 10 Counties
- Branch Profiles
  - 4 Branches



# OA Annex Review (1 of 3)

- Community Profile
- Population
- Cities and Places
- Geography
- Hydrology
- Rivers/Streams
- Flood History
- Flood Risk
- Total Acres Exposed to Flooding
- List of Local Maintaining Agencies
- Levee Miles and Vulnerabilities
- Flood Triggers
- CNRFC River Gage Forecast
- Points with E-19 Impact Information
- Dams



# OA Annex Review (2 of 3)

- First Responder Agencies/Entities
- Regularly Monitored Radio Channels
- Transportation/Evacuation - Surface, Regional, Aviation, Rail, Ports, and Population Movement
- Infrastructure – Energy, Water/Waste Water, Drinking Water, Communications,
- Local Government Centers – County, EOCs, Fire, Law, Correctional, Schools, Tribal
- Agriculture – Crops and Dairies
- Logistics – County Staging Areas, Public Health and Medical PODs
- Mass Care – Capacity, Vulnerable Populations, Feeding Facilities, AFN Facilities and Pets



# OA Annex Review (3 of 3)

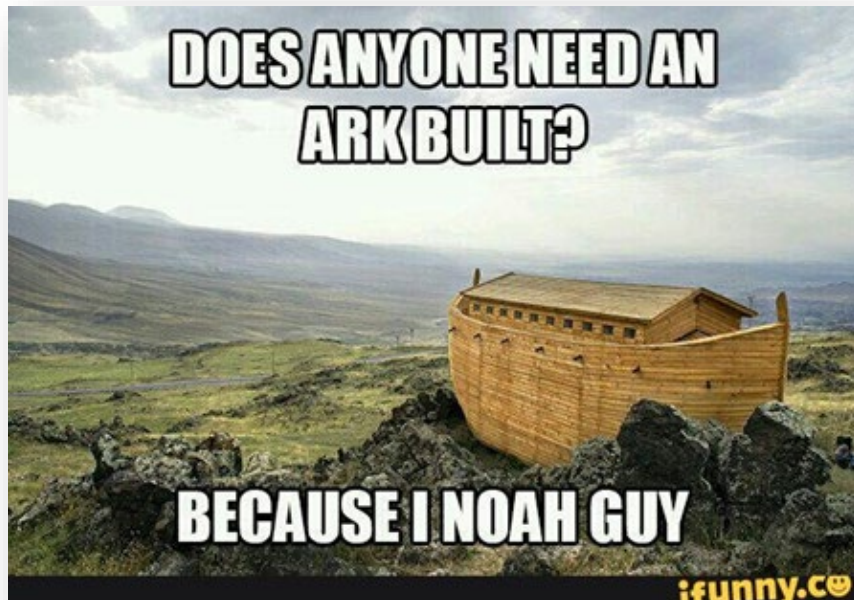
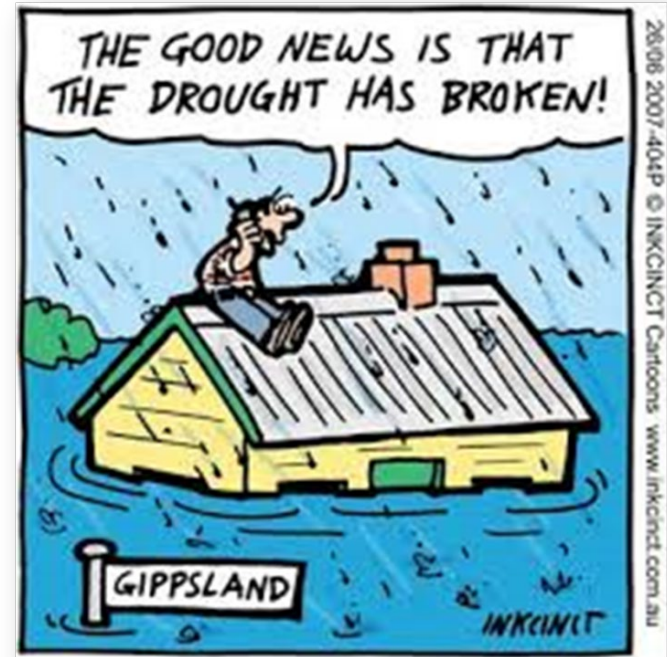
- Health and Medical
  - All Facilities
  - Tracked Beds by Type
  - Surge Capacity
  - General Acute Care Hospitals
  - Trauma Centers
  - Emergency Departments
  - Psychiatric Hospitals
  - Skilled Nursing Facilities
  - Chronic Dialysis
  - Long Term Health Care
  - Alternative Birth Center and Ambulatory Surgery Centers
  - Adult Day Health Center, Home Health Agencies, and Hospice
  - Community and Rehabilitation Type Services
  - Correctional Treatment Centers
  - Medical Health Operational Area Coordinator Information



# Regional/OA/Branch Maps

- Maximum Flood Boundaries
- Levee Vulnerability
- Transportation
- Communications
- Dams
- Electricity Power Plants and Transmission
- Natural Gas
- Oil Supply
- Wastewater
- Essential Facilities (county seat, city/county EOC, SOC/REOC, fire stations, law enforcement stations, prisons)
- Healthcare and Healthcare with Levee Vulnerability overlay
- Access and Function Needs (Mass Care)
- Schools
- Shelters
- Feeding Facilities
- Tribes
- National Guard (facilities & members)
- Dairies





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<https://www.caloes.ca.gov/cal-oes-divisions/planning-preparedness/catastrophic-planning>



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